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Intellectual property and the future of NFT market

Propriedade intelectual e o futuro do mercado NFT

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Abstract

The paper aims to discuss the NFT market and the alleged causes of the crisis. Legal causes for the NFT crisis are the IP system based on human creativity benefits grant, unaffected WIPO agency orientations and propositions, and the same for local Government, AI as substitute goods and its regulation again linked to the IP system. NFT uncertainty and inclusion into a regulated market, including taxation, reduce the potential growth based on demand. AI is a substitute and not a complementary good, and the free outcomes from AI models in art and pictures are now part of the goods offered. The surviving NFT market still stands but reduced from the 2023 peak. However, a new regulation is needed to clarify definitions and possibilities of future growth and the market boundaries in the metaverse.

Keywords: Artificial Intelligence. Intellectual Property. NFT

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Resumo
O artigo tem como objetivo discutir o mercado de NFT e as supostas causas da crise. As causas legais para a crise dos NFT são o sistema de PI baseado na concessão de benefícios à criatividade humana, as orientações e propostas das agências da OMPI não afetadas, e o mesmo para o governo local, a IA como bens substitutos e a sua regulamentação novamente ligada ao sistema de PI. A incerteza e a inclusão do NFT num mercado regulamentado, incluindo a tributação, reduzem o crescimento potencial com base na procura. A IA é um substituto e não um bem complementar, e os resultados gratuitos dos modelos de IA em arte e imagens fazem agora parte dos bens oferecidos. O mercado NFT sobrevivente ainda está de pé, mas foi reduzido em relação ao pico de 2023. No entanto, é necessária uma nova regulamentação para clarificar as definições e possibilidades de crescimento futuro e os limites do mercado no metaverso.

Palavras-chave: *Inteligência Artificial. Propriedade intelectual. NFT.*

1. Introduction

A non-fungible token (NFT) is a unique digital identifier. It is recorded on a blockchain and certifies ownership and authenticity. It cannot be copied, substituted, or subdivided. The ownership of an NFT can be transferred, sold, and traded. It is a new class of investment asset because an NFT is as good as a bitcoin. The report claimed that over 95% of NFT collections had zero monetary value. The Statista group[3] reported that the Revenue in the NFT market is forecasted to reach US$608.6m in 2025. The number of users in the NFT market will reach 11.64m users by 2025 and increase to 0.15% by 2025. The United States remains the dominant marketplace due to its digital infrastructure and strong investor interest.

Intellectual property system rights seek a future scenario when the Metaverse and its architectural components, like NFT, are also the owners of property rights. Corporations or privates are legal subjects, will use massive AI outcomes to overpass the traditional process based on human creativity alone, and the product cycle changes and speeds up. In all new markets the changes in IP rights will be critical to the growth foresee all trends and typologies.

There are several challenges to analyzing the digital market of NFT, bitcoins, and digital properties. One is the protection of ownership in the Wipo system, or the form and standard to register intellectual property, new technologies, and the regulation of generative AI issues. Second, the NFT market is heavily affected by the context, and it is not growing at the same speed as before. There are a bulk of issues and fences impacting the market and a super offer of new products. That could explain the NFT actual market, and the primary cause of the actual poor incremental rate compared to before is a mix of lack of regulation and concurrency of AI.

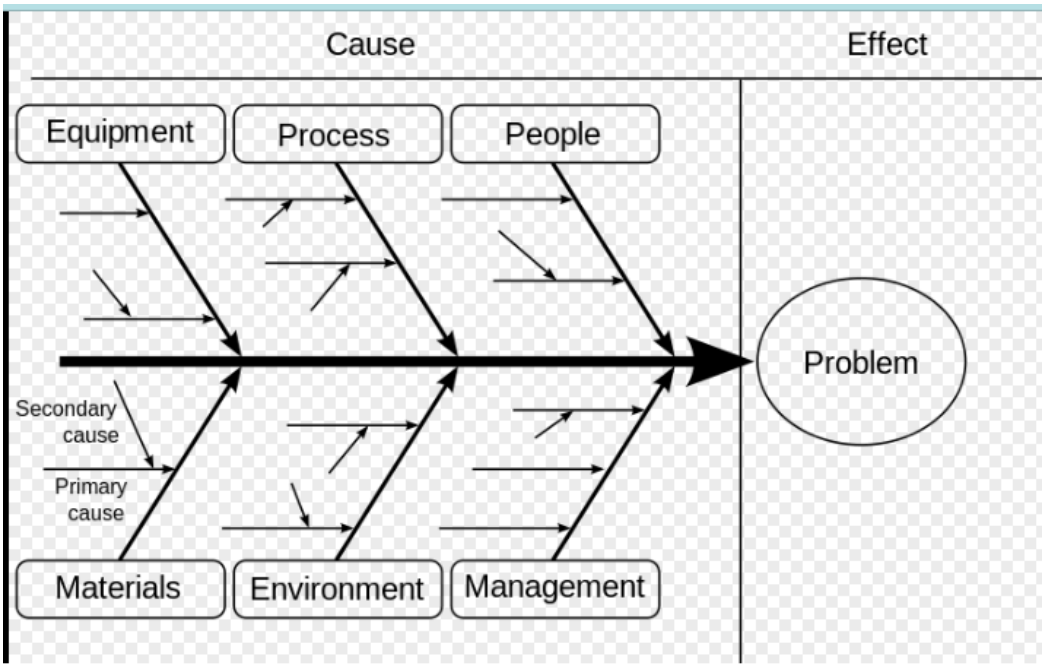
To explain that problem, the NFT values waves, we focus on legal issues. The paper will summarize the regulation context of the NFT market and NFT regulation, discuss the actual market, and give an explanation of possible causes found in that analysis. The research is willing to explain the following problem, among others: Why did the NFT market stop? And if it is, why and what are the causes?

[3] https://www.statista.com/outlook/fmo/digital-assets/nft/worldwide

2. Methodology

The discussion methodology is supporting the answer to the introducing question. It apply the fishbone analysis to determine causes of the problem. A fishbone analysis produce a diagram with cause and effect. The fishbone is called also Ishikawa diagrams[4]. The problem or effect is displayed at the head or mouth of the fish and the causes are the fishbones as in the figure below

Figure 1 - Fishbone diagram



Source: By FabianLange File:Ursache_Wirkung_Diagramm_allgemein.svg, https://commons.wikimedia.org/w/index.php?curid=6444290.

The NFT market stasis and multiple causes of different levels are relied on: 1) legal framework uncertainty, 2) WIPO system or Intellectual Property (IP), and 3) AI regulation and new product offer (AVENI, FARIA 2024). We discuss these three legal causes in the paper, seeking a possible solution to mitigate the adverse effect on the market.

The economic theory underlines the NFT cycle of products is affected by complementary (When two goods are complements, they experience joint demand - the demand for one good is linked to the demand for another good), substitute goods (substitute goods are two goods that can be used for the same purpose by consumers). They are network costs of an information market (SHAPIRO, VARIAN 1999, VARIAN 1992).

A possible solution to the problem of NFT market reduction is to seek the NFT product cycle and compare the complementary goods that people tend to buy at the same time because they go well together or enhance each other's use. In other words, AI outcomes, for economic purposes, are complementary or substitute goods to another information market. It is possible to figure out the information tools offered as a unique part of the production chain (supplier chain). Thus, an economic evaluation

[4] Ishikawa, Kaoru (1968). *Guide to Quality Control*. Tokyo: JUSE

is also necessary but is a limitation of the research aim. It could be possible in another paper to develop details and discuss the NFT product cycle and the economics of information.

The proposed legal aspect of the solution is at the end of the discussion: 1) In the metaverse market, clients are consumers but also producers; 2) AI products are not intellectual property; 3) All AI non-fungible tokens complementary to NFT are not included in the NFT market.

The analysis implies that changes in IP regulation, and AI patents will increase the NFT market by regulation. The legal change could add to the market AI outcomes are included in some marketing processes but not as goods. That will grow the market again. To cite an opposite point of view, it could seek Wang, Lee, and Liu's (2024) paper claims that there is no chance to regulate, but the solution is NFT keeps going unregulated.

3. Discussion and Results

The paper's discussion is divided into sections to explore the main causes identified in methodology in the methodological approach to the problem. The discussion starts with the NFT and its market, then the legal problems caused. At first, we seek the WIPO system so we develop a narrative of what is it and its discussion about NFT. Another section explains the regulation of the main cause, we guess, block NFT expansion, the AI actual regulation

3.1. NFT: Property Rights and market

Commodities tend to be fungible: silver, gold, oil, grain. Conversely, non-fungible goods are unique one-offs, like custom-made silver necklaces, golden statuettes, or paintings. The most popular NFT uses the Ethereum infrastructure. Non-fungible goods use a token standard known as ERC-721[5].

An NFT[6] is a cryptographic token hosted on a blockchain or a "proof of art". The token can be used to represent the digital asset. NFTs as digital assets are not fungible or they are not like cryptocurrency. That means they represent the ownership of the token related to the image, picture, artwork, video game items, trading cards, virtual real estate, and other digital goods created and put into the blockchain.

There will be some practical interaction between NFTs and copyright. However, a copyright assignment is "a writing signed by or on behalf of the assignor". Copyright is the author's right. It is a legal term used to describe the rights that creators have over their literary and artistic works. It's difficult to see how an NFT would fulfill all copyright requirements. The market is already acting as a gatekeeper. Nonetheless, the nature of the market and the incentive means that the NFT space may generate many copyright disputes.

The most known example of the great value of an NFT was when in May 2007, the digital artist known as Beeple posted a new work of art online every day for 5,000 days straight. Individually known as every day, collectively, the pieces form the core of EVERYDAY: THE FIRST 5000 DAYS[7], became one of the most unique bodies of work to emerge in the history of digital art, attracts almost 2 million visitors, and is valued at almost 70 million dollars.

Some research shows that investors are more attracted to NFTs after increases in both Bitcoin and Ethereum returns. The excitement around cryptocurrencies induced

[5] https://eips.ethereum.org/EIPS/eip-721
[6] https://www.wipo.int/wipo_magazine/en/2021/04/article_0007.html
[7] https://www.analisidellopera.it/everydays-the-first-5000-days-beeple/

by record-high prices in 2021 could explain the NFT growth in popularity during the same period, and marketing managers' attitude, to adopt NFTs so as not to lose their competitive advantage (Pinto-Gutiérrez et al. 2022, Chohan 2023).

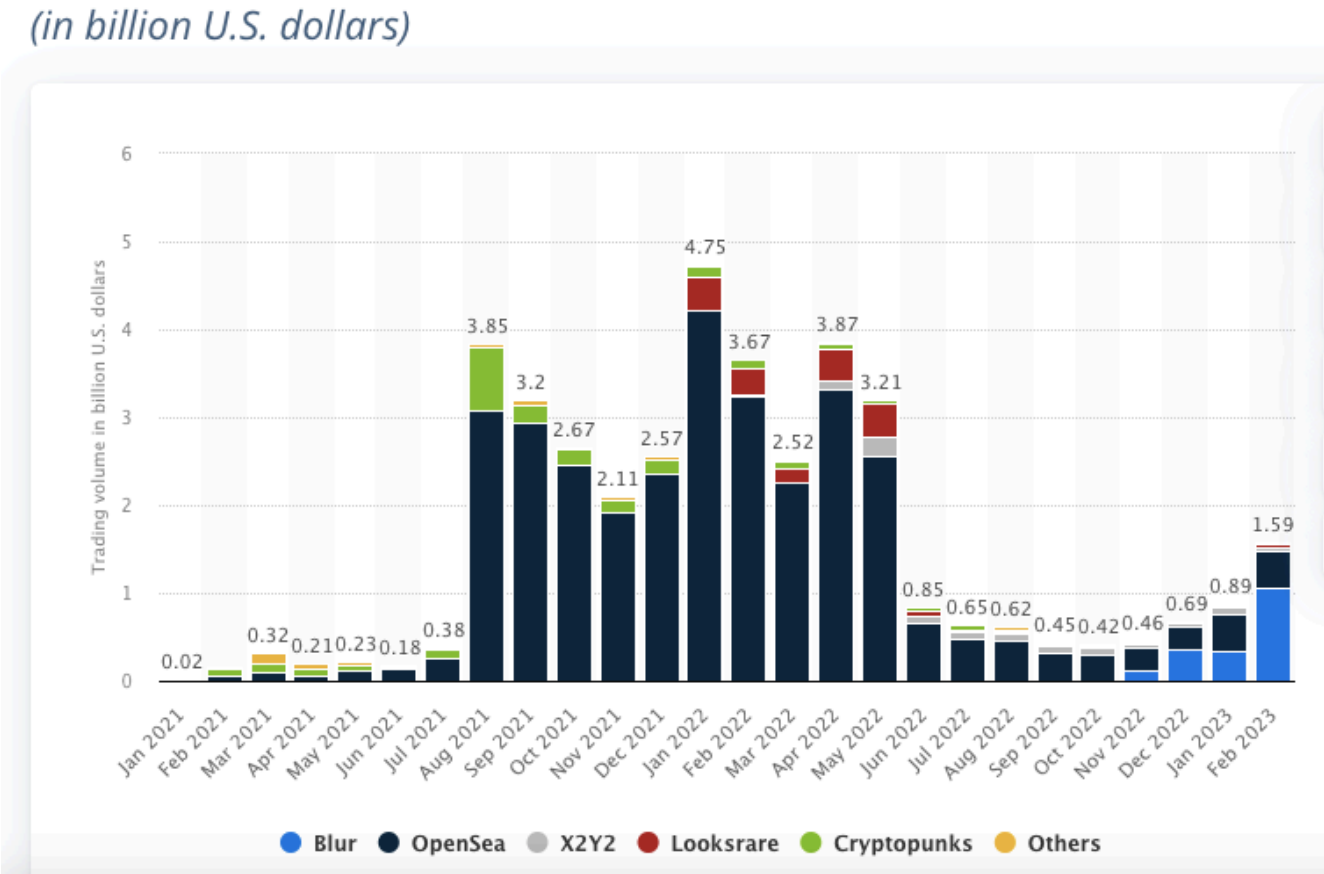
The following graph shows the NFT market from 2021 to 2023 from the Statista platform with a release date of March 2023. According to the Nonfungible.com site [8], the sales in April 2024 hit 1,2 billion dollars[9]. The trend was very complicated, and today a slow decline. That allows analysts to say that the market is almost dead[10].

Nasdaq reported the market had a 17,5 billion $ hedge in September 2022. Some experts never believed in the value of NFTs, arguing that they never were viable investments in the past, but they were vehicles for speculation. AI-generated NFTs will drive renewed interest and lead to a rebirth of digital art but without a direct growth in NFTs.

Finally, according to STATISTA internet site[11],, revenues in the NFT market are projected to reach US$2,378.0m in 2024. Revenue is expected to show an annual growth rate (CAGR 2024-2028) of 9.10%. That will result in a projected total amount of US$3,369.0m by 2028. In the NFT market, the number of expected users will amount to 16.35m users by 2028. Thus, the market still stands but eventually will not reach the target in 2028 and continue with an average of between 2 and 3 billion $.

[8] https://nonfungible.com/
[9] https://nonfungible.com/market-tracker
[10] https://www.nasdaq.com/articles/are-nfts-still-viable-investments-in-2024
[11] https://www.statista.com/outlook/fmo/digital-assets/nft/worldwide

Graph 1 - Trading volume on individual NFT platforms, including OpenSea and Blur,



from January 2021 to February 2023

Source: https://www.statista.com/statistics/1376289/nft-trading-volume-on-selected-platforms/

3.2. WIPO legal system

Intellectual property (IP) refers to creations of the mind, such as inventions, literary and artistic works, designs, symbols, names, and images used in commerce. National and international law protect Intellectual property. However, the classification varies all over the world (WIPO 2022).

The World Intellectual Property Organization (WIPO 2022) is a specialized agency of the United Nations responsible for promoting and protecting intellectual property (IP) worldwide. WIPO provides a framework for international cooperation in intellectual property. It administers various treaties and conventions that harmonize IP laws across different countries.

Here are the main types of intellectual property defined and protected by WIPO:

-Patents: Definition: A patent is an exclusive right granted for an invention, a product, or a process that provides a new and inventive solution to a technological problem. Protection: Patents grant inventors exclusive rights to make, use, and sell their inventions for a limited period, usually 20 years from the filing date.

-Copyright: Definition: Copyright protects the rights of creators in their literary, artistic, and musical works. That includes books, music, paintings, sculptures, films, and other forms of creative expression. Protection: Copyright provides the creator with exclusive rights to reproduce, distribute, perform, and display their work. The protection typically lasts for the lifetime of the creator plus a certain number of years.

-Trademarks: Definition: A trademark is a distinctive sign that identifies and distinguishes the goods or services of one party from those of others. Trademarks can include words, logos, symbols, and other elements. Protection: Trademarks protect the goodwill and reputation of businesses by preventing others from using similar marks that may confuse consumers.

-Trade Secrets: Definition: Trade secrets are confidential business information, such as formulas, processes, and methods, that provide a competitive advantage.Protection: Unlike patents, trademarks, and copyrights, trade secrets are protected without registration. Protection is maintained as long as the information remains confidential and measures are taken to keep it secret.

-Industrial Designs: Definition: Industrial designs refer to the visual design of objects, such as the shape, surface, or ornamentation of a product. Protection: Industrial design protection grants exclusive rights to the visual aspects of a product for a limited period. Typically from 15 to 25 years.

- Geographical Indications: Definition: Geographical indications identify products originating from a particular place and having qualities, reputation, or characteristics that are essentially attributable to that place of origin. Protection: Geographical indications protect the rights of producers and prevent the use of misleading indications on products that do not originate from the claimed place.

The actual Intellectual property (IP) systems have been designed to incentivize human innovation and creation[12]. WIPO does not provide direct protection for specific outcomes generated by NFT and artificial intelligence (AI). Different types of intellectual property may intersect with those new technologies. Especially in Copyright protection typically applies to original works created by human authors. WIPO and the international IP system today generally deny AI and NFT innovation owner eligibility for intellectual property certification. As a general rule (WIPO 2022) WIPO denies registration of AI outcomes being AI the owner. That is because the innovation process could be defined as a step-by-step process.

There is an ongoing debate about whether those frameworks and systems will be modified with machine-created inventions/works. There is also a debate about the line between human and machine creation, and how much / how little human input or guidance may be required. The human connection to machine outcome is mandatory. The registration can be done only through private or legally registered organizations. In our opinion, The complexity and the machine-generated code of the FT and AI models only could be certified by a new form of intellectual property because the actual token for NFT or program certification for AI models doesn't protect the "owner of the creativity and art".

[12] https://www.wipo.int/about-ip/en/artificial_intelligence/policy.html and https://www.wipo.int/meetings/en/details.jsp?meeting_id=72090

3.3. The legislative context.The WIPO analysis

In this section, we resume some WIPO insider conversations on AI and new technologies. The result of the research in this section shows little advance in solving the regulation problem in many years. The WIPO conversation started in 2019, and after five years, no solutions came to solve the many issues discussed.

In the seventh session of the WIPO[13] discussion, in 2021, emerged at first the security of new technologies like AI. All information seems like noise until you crack the code". The Metaverse is the virtual place where new technologies develop. The conference included stories from developers, and architects building the Metaverse.

Regarding Metaverse IP Stories, many existing companies are exploring how to create a presence. Sneaker and handbag NFTs are just one example. Entirely new entities like DAOs are emerging. Engineers and manufacturers are using digital twins to optimize projects and processes. Although the Metaverse still has a nebulous form, it is clear that IP will play a key role in supporting innovation, building the virtual world, and driving economic growth and activity.

The economic importance of the digital economy cannot be underestimated. Based on intangible assets, IP will be a key factor in realizing this potential. One of the most advanced applications of the Metaverse is video games. NFT sneakers and bags have highlighted intellectual property disputes in the Metaverse. NFT deepfakes impact how shape protection and enforcement mechanisms in the Metaverse. The virtual world is built on intangible assets and increasingly complex IP landscapes, there is much greater room for disputes.

The potential of the Metaverse was discussed. Can the Metaverse bridge the technology gap? The presentation looked at the difference in global perception of the Metaverse, how the Metaverse can help close the technology gap and help achieve the SDGs (health, education, etc.), and what is needed to realize this potential. DAOs, NFTs, and smart contracts operate using self-executing contracts with the terms of the agreement between the buyer and seller being written directly into lines of code. DAO governance is coordinated using tokens that grant voting powers.

The Metaverse has its emerging technologies: AI, blockchain and NFTs, AR and VR technologies, Internet of Things, and data processing. Generative AI models potentially range from music composition and video generation to molecular modeling in drug discovery and medical diagnostics. GenAI today creates music, images, and other forms of content and a multitude of intellectual property issues related to it. There is a discussion about generative AI and creating new data similar to your training data. It is any machine learning model capable of dynamically creating results after training.

NFT and AI are used as an iteration tool of the Internet as a single, universal, immersive virtual world facilitated by virtual reality (VR) and augmented reality (AR) headsets. It is the hypothesis of the Industry 5.0 affirmation. Human-machine connection is a buzzword to exaggerate the development progress of various technologies and related projects in work processes. The term metaverse includes virtual reality, technology, Web3, and blockchain technology.

In the Metaverse, copyright laws still apply. The Metaverse however raises IP issues across the entire range of IP rights, IP registration, and IP enforcement. The absence of clear rules and private contractual terms between platforms, content providers, and users can play a crucial role in content licensing, and charging royalties will introduce another layer of complexity when dealing with a multiverse of Metaverses.

[13] https://www.wipo.int/meetings/en/details.jsp?meeting_id=74608

Trademark protection is an economic concern. The registration and application of trademarks for goods and services are now offered by virtual marketplaces offering NFT products. Based on this, business models and various trademark infringement litigation issues were initiated, such as jurisdiction and applicable laws, non-commercial and fair use defenses, and the likelihood of confusion.

Can virtual designs be protected by design rights? Virtual designs such as graphical user interfaces (GUIs), icon designs, font designs, and three-dimensional designs raise this question. In some countries, protection is available for virtual designs other countries have separated virtual designs from physical products. Patenting in this area can be difficult because it must have a demonstrable technical effect. Such software is excluded from protection.

Virtual tourism pictures and movies, the replication and appropriation of landscapes, traditional crafts, characters, designs, and languages that reflect cultural identity must be protected. Indigenous Peoples must be allowed to express and share their traditional knowledge (TC) and traditional cultural expressions (TCE).

Finally, the Metaverse and its use of digital twins. A digital twin is a virtual copy or simulation of a physical object, system, or process. It is created by integrating sensor data into computer simulations. A completely virtual world with virtual assets and transactions raises complex questions regarding applicable laws and the infringement/enforcement of IP rights, which are territorial. Smart contracts can also play a role in facilitating IP enforcement and fair royalty payments, providing additional security to IP owners.

In 2022, the eight conversation[14] centered on generative AI. The Rapid Rise of Generative AI: Opportunities and Challenges Ahead Explaining why generative AI is breaking the paradigm of AI development. The talk will take the audience on a journey into what the future may hold. An introduction to generative AI was covered, including an overview of the technical aspects of the technology, its potential applications across various industries, its current limitations, and a look at what may be in store in the future.

Is the impact of generative AI on creative Industries for human creativity or creative destruction? The economic and broader impact of generative AI on the creative industries, including the potential opportunities and challenges that arise from integrating AI technology into creative processes. Generative AI has generated works that have won art competitions and are making headlines. It will also analyze the role of the AI developer, the artist, and the end user in determining authorship and ownership.

Generative AI raises many concerns beyond its technical limitations, addressing issues of reliability, accuracy, and ethics arising from social risks of misinformation, market manipulation, cybercrime, threats to privacy and democracy, and unintended consequences in content creation and cultural diversity, job displacement, linguistic prejudices, lack of transparency, the influence of large companies on regulations, economic inequalities and monetization of data collected in countries without proportional benefits.

Generative AI tools are used for writing, visual content, and coding not just by professionals and companies. Generative AI could compete economically with human creators and challenge traditional notions of authorship and originality with regard to potential copyright infringements by including protected works in training data and copyright protection for AI-generated outputs.

[14] https://www.wipo.int/meetings/en/details.jsp?meeting_id=78188

The best approach to protecting generative AI models with IP depends on several factors, including the nature of the AI, the jurisdiction, and the specific elements intended for protection. Patents, trade secrets, and copyrights play an important role. The generative AI invention process complements human innovation when generating new ideas and solutions. Humans still play a critical role in the invention process, defining problems, setting goals, and determining how insights generated by AI are applied.

In the ninth conversation [15], a high-level panel brought together diverse perspectives on the evolving landscape of AI, creativity, and intellectual property. It will illuminate the complexities and potential tensions that arise at the intersection of AI development, artistic creation, and the new balance they seek.

It was discussed fair compensation for creatives. This presentation will explore how fair compensation for creators could be defined and how that compensation could be collected and distributed, existing copyright limitations and exceptions, such as text and data mining provisions, the fair use doctrine, and other approaches. The discussion addressed how these provisions impact innovation, research, and collaboration, highlighting both opportunities and challenges in this regulatory landscape.

The session faced new approaches for the new era of AI. Training data poses a copyright conundrum. On the one hand, copyright owners have the right to control access to their work and to receive compensation. On the other hand, developing accurate data and unbiased AI models requires access to vast amounts of data, and civil society is adopting AI tools at an exponential rate. Creators and AI companies are looking to shape new solutions to define a path forward.

This panel aimed to discuss possible solutions that could allow creators to maintain control over their work and provide access to training data for AI innovators. The discussion highlighted possible developments in licensing structures, collaborative approaches, lessons learned from copyright collection schemes, and the advancement of technological measures. It will also highlight the potential challenges faced by these new approaches. The discussion will emphasize the crucial role of human creators in ensuring diverse and representative AI outcomes.

The 10th session of the WIPO Conversation on AI Outputs: To protect or not to protect - That is the IP Question, will take place on 5 and 6 November 2024, 10:00 - 18:00 (CEST), in a hybrid format (in person and online (via Zoom))[16]. The conversation focused specifically on the topic of whether AI-generated outputs should be granted intellectual property protection and the legal complexities surrounding it.

AI tools become increasingly adept at generating content. The session explores the question if whether AI poses a threat to human creators or serves as a valuable collaborator, and whether AI-generated content should be eligible for copyright protection. The rise in AI-generated deep-fakes resulted in IP questions around voice and image rights. Some experts have even advocated for a new kind of IP right.

3.4. European AI act the directive to minimize AI risks

The final AI Act is a result of roadmap form April 2021, when the Commission presented its AI package, to ensure that AI is human-centric and trustworthy and realize the Regulation Act in march 2024. In January 2024 The Commission launched the AI innovation package to support Artificial Intelligence startups and SMEs . According to the Regulation the main initiative “GenAI4EU” look for stimulate the

[15] https://www.wipo.int/meetings/en/details.jsp?meeting_id=81668
[16] https://www.wipo.int/meetings/en/details.jsp?meeting_id=84809

uptake of generative AI across the Union's key strategic industrial ecosystems (EUR-Lex 2021).

The European approach to AI enables the development of AI in the EU and becomes a strategic leadership in high-impact sectors for the benefit of industry and society[17]. Access to high-quality data is an essential factor in European Union-started initiatives such as the EU Cybersecurity Strategy and the right infrastructure for building AI systems.

To build trustworthy AI the EU proposed inter-related legal initiatives: 1) a European legal framework for AI; 2) a civil liability framework - adapting liability rules to the digital age and AI; and 3) a revision of sectoral safety legislation. That will give AI developers, deployers, and users the clarity they need by intervening based on different levels of risk.

According to the Act (EUR-Lex 2021), the purpose of the AI Act in Europe is to improve the development, market, service, and use of artificial intelligence systems (AI systems) uniform legal framework in the Union, according to the Union values enshrined in the Charter of fundamental rights of the European Union. The Act must comply with democracy, the rule of law, and environmental protection, ensuring the free movement, cross-border, of AI-based goods and services, thus preventing Member States from imposing restrictions on the development, marketing, and use of AI systems, and supporting innovation.

There are four categories of risk ("unacceptable", "high", "limited" and "minimal"). AI, transparency requirements are imposed when representing particularly high risks. All AI applications that represent unacceptable risks are banned. High-risk ones must comply with security, transparency, and quality obligations defined in the Act. Limited-risk AI applications only have transparency obligations. The ones representing minimal risks are not regulated. Risk categories (EU 2024) are the following :

General-purpose AI ("GPAI"): added in 2023 includes in particular foundation models like ChatGPT. They are subject to transparency requirements. High-impact general-purpose AI systems that could pose systemic risks must have an evaluation process.

Unacceptable risk: Includes AI applications that manipulate human behavior, those that use real-time remote biometric identification (including facial recognition) in public spaces, and those used for social scoring (ranking people based on their characteristics, socio-economic status, or behavior).

High-risk: are applications that pose significant threats to health, safety, or the fundamental rights of persons. There are AI systems used in health, education, recruitment, critical infrastructure management, law enforcement, or justice subject to obligations of quality, transparency, human supervision, and security. They must be evaluated before they are placed on the market, as well as during their life cycle.

Limited risk: impose obligations aimed at informing users that they are interacting with an artificial intelligence system and allowing them to exercise choices of AI usage. For example, AI applications that make it possible to generate or manipulate images, sound, or videos (like deep-fakes).

Minimal risk: Most AI applications to handle systems (for example, automated car drive) of processes in particular tasks or as productivity tools are expected to be in this category when a voluntary code of conduct is suggested.

[17] https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence

The risk safeguard follows the ISO 27001 / 22[18] approach to secure the IT ecosystem. A consistent and high level of protection praise for uniform obligations for operators and guaranteeing the uniform protection of overriding reasons of public interest and of rights of persons throughout the internal market.

The Act is also consistent with The General Data Protection Regulation (Regulation (EU) 2016/679, abbreviated GDPR) on information privacy in the European Union (EU 2016). The GDPR regulates privacy and human rights law, and It also governs the transfer of personal data outside the EU and EEA. The Regulation contains specific rules on the protection of individuals. For example, the processing of personal data. The Act contains restrictions on AI systems for remote biometric identification.

In the Act, the notion of 'AI system" is based on key characteristics of AI systems that distinguish it from simpler traditional software systems or programming approaches and should not cover systems that are based on the rules defined solely by natural persons and automatically execute operations. A key characteristic of AI systems is their capability to infer and refers to the process of obtaining the outputs, such as predictions, content, recommendations, or decisions, which can influence physical and virtual environments, and to the capability of AI systems to derive models or algorithms from inputs or data. 'machine-based' refers to the fact that AI systems run on machines.

The definition of the Act implies AI is not comparable to human or human beings but to programming models or programs and their hardware. The AI model is hardware, software, and human capability to operate the system. The AI system can be used on a stand-alone basis or as a component of a product, physically integrated into the product (embedded) or without being integrated therein (non-embedded). Then, if AI outcome is integrated into a blockchain, it could result in a legal NFT but that is not in the Act.

To clarify: in the IP legal framework, the Act defines the figure of the 'deployer'. That is any natural or legal person, including a public authority, agency, or other body, using an AI system under its authority. An AI system may affect persons other than the deployer. AI models must be equipped with literacy to allow providers, deployers, and affected persons with the necessary notions to make informed decisions. The affected person of an AI model must have the knowledge necessary to understand how decisions taken with the assistance of AI will have an impact on them and sustain trustworthy AI in the Union.

A point to worry is that enforcement authorities will lack resources to investigate self-proclaimed "reduced risk" systems, which might not be of high priority. However, the Regulation includes obligatory fundamental rights impact assessments (FRIAs) within the group of duties incumbent on deployers of high-risk systems (Art. 29a) and that is obliging deployers to assess and mitigate a system's foreseeable impacts on marginalized and vulnerable groups.

The EU believes that the risks of the European GPAI model are low because of the transparency provided by Open Source models. The European complex governance system includes: the AI Office, The European Artificial Intelligence Board ("Board"), The Advisory Forum, The Scientific Panel of Independent Experts, and National supervisory authorities. The main responsibility is with national market surveillance authorities based on Art. 63, Regulation 2019/1020. Coordination and harmonization seem to be difficult and a slow process.

[18] https://www.iso.org/standard/27001

3.5 Discussion result: Future for NFT market.

The fungible token widely negotiates with cryptocurrency. The offer of new creative solutions with AI generative tools or AI outcomes reduces the value of the assets because of the substitution of part human creativity with AI models with no cost. Thus, the impact was to reduce the price of an NFT depending on how easy to copy or imitate a creative good.

The market experienced the same impact as the music market when Napster and YouTube started their activities. But, even the art market before it, was impacted by posters or digital creations. Thus, their assets lowered values. The NFT product market cycle implies a reformulation of values and cost structure. The last is less problematic because linked to blockchain, and its cost is also very low. It could be said that the expectation of screaming the market has ended today. An NFT market will persist because of marketing development and constant renewal campaigns to reach new customers and to be fashioned as the customer's tastes evolve.

According to Qin Wang, Rujia Li, and Qi Wang Shiping Chen (2021), there are some opportunities of NFTs where may get benefits from NFTs:

Gaming Industry. NFT has great potential in the gaming Industry where users can personally raise pets and sell them. NFT provides also the ownership records of items in the games and the opportunity to earn royalties each time their items are resold on the open market. This secondary NFT market covers various types of digital assets.

Virtual Events. When buying tickets in a traditional event ticket market there is a risk of buying fraudulent or invalid tickets. An NFT-based ticket means that the ticket holder cannot resell the ticket after it is sold.

Digital Collectibles. Digital collectibles contain a variety of types. With NFT artists do not have to transfer ownership and contents to agents, and the artist receives a predetermined royalty fee each time when his digital artwork is exchanged in the markets are several platforms that have even established tools to support ordinary people to create their own NFT works easily.

Metaverse. The users also have opportunities to get profits from the virtual economy. They can lease virtual buildings to others to earn the bond, raise pets and sell them, or many other things like the real world.

The main threats of NFT are legal uncertainty and taxation. NFT-based sales stay out of taxation. Some countries tax cryptocurrencies as property, but most areas worldwide have not yet considered it. It would be wise a tax bracket applied to trace activities and avoid the black market or money washing for properties or collectibles. A taxation scheme should reduce speculation and incorporate in the real economy the NFT market sunk.

What was NFTs' decline rumor[19] ? Some problems in the last years: market over-saturation, speculation, and scams. The technology and potential use for NFTs in the future:

1. Integration with Emerging Technologies like AI-generated NFTs, augmented reality (AR), and virtual reality (VR) or Metaverse Adoption.

2. NFTs changed and are no longer limited to digital art and collectibles. They will be used for Ticketing, Real estate, and luxury goods industries, Tangible in-game.

3. Renewed Trust and Regulation. Stronger Consumer Protections, Partnerships with established brands

[19] https://coincrowd.com/blogs/nfts-in-2025-are-they-making-a-comeback

However, there are also challenges to NFT market survival:
Energy Consumption must reduce its environmental impact,
Need more user-friendly platforms.
Careful navigation by investors, taxation system, and more information.

In conclusion, NFT ecosystem potential extends far beyond digital collectibles and will evolve into part of a new immaterial capital market like Bitcoin. NFTs in 2025 are evolving into Web3 innovation and integration with cutting-edge technologies.

4. Concluding remarks

The research is based on fishbone analysis and discusses three main legal causes of NFT market stasis and reduction. We argued that these causes implied uncertainty in the NFT market and the mess of what the definition is. The NFT legal uncertainty is a principal week of the market and the IP system and Wipe are the agents of governance to advance solutions.

NFT will evolve from AI generation of goods and property definition because there are no AI owner models registered outcomes. AI could be integrated into a process as a program, or part of the process, but not as owner of copyrights. All NFT produced by AI and other new technologies today can't be counted as NFT but increase only an inbound marketing process as a sunk cost, the one that has already been incurred and cannot be recovered.

The NFT cycle of products is also affected by complementary goods (when two goods are complements, they experience joint demand - the demand for one good is linked to the demand for another good), substitute goods (substitute goods are two goods that can be used for the same purpose by consumers). They are network costs of an information market (SHAPIRO, VARIAN 1999).

So out of the three main causes we discuss in the paper, the generative AI increase and lack of legislation especially impact the NFT market. AI and other technology outcomes are NFT substitutes and network costs of a marketing process that uses images, sound, or other media, but they are no good because of the legal framework.

The cause-effect analysis defined in the paper implies that change in IP regulation and mainly AI's outcomes possible copyright patent will increase the NFT market by adding actual AI outcomes as complementary or substitute goods and increase the NFT market. It is worth the taxation issue but reduces uncertain and black market risks. An evolution of the NFT market is likely to overlap the problems and maintain the value, or also increase the values.

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